

*Doğuş Üniversitesi Dergisi, 15 (1) 2014, 15-30*

## **IS FDI BENEFICIAL FOR DEVELOPMENT IN ANY CASE: AN EMPIRICAL COMPARISON BETWEEN GREENFIELD AND BROWNFIELD INVESTMENTS**

***DYY KALKINMA İÇİN HER ŞARTTA YARARLI MIDIR: YEŞİLALAN VE  
KAHVERENGİALAN YATIRIMLARI ARASINDA AMPİRİK BİR  
KARŞILAŞTIRMA***

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**ABSTRACT:** In literature, the “quality” of FDI rather than its “quantity” was started to be focused on in order to be beneficial for economic development. One of the indicators of FDI’s “quality” is accepted as its “mode of entry”, greenfield or brownfield investments. The paper argues that greenfield investment is more useful for development in order to have its direct positive impact through investment. The paper empirically investigates this by a cross-section data analysis. The main findings support this argument. Findings also back the argument that brownfield can be beneficial for development in the long-run in relation with human capital development.

**Keywords:** FDI; Greenfield versus Brownfield Investments; Development

**JEL Classification:** F21; F23; G34; O40

**ÖZET:** Literatürde, ekonomik kalkınmaya yararlı olması amacıyla DYY’nin “niteliği”nden çok “niteliği”ne odaklanılmaya başlanmıştır. DYY’nin niteliğinin bir göstergesi olarak DYY’nin “giriş şekli” (yeşil alan ya da kahverengi alan yatırımları) kabul edilmektedir. Çalışma, yatırım kanalıyla doğrudan olumlu etkisine sahip olmak amacıyla yeşilalan yatırımının kalkınma için daha yararlı olduğunu savunmaktadır. Çalışma bunu ampirik olarak bir yatay kesit veri analizi ile araştırmaktadır. Ana sonuçlar bu argümanı desteklemektedir. Aynı zamanda bulgular kahverengi alan yatırımının insan sermayesinin gelişimi ile ilişkili olarak uzun vadede kalkınma için yararlı olabildiği argümanını da desteklemektedir.

**Anahtar Kelimeler:** DYY; Kahverengialana Karşı Yeşilalan Yatırımları; Kalkınma

### **1. Introduction**

For over two decades developing countries have been trying to use the Foreign Direct Investment (FDI) as a financial resource. This is mainly due to the facts that debt crises in the 1980s reduced the foreign bank loans availability as a financial resource and also as another possible financial resource short term portfolio investment created several financial crises in the 1990s. Hence, FDI is unconditionally invited to the developing countries for developmental purposes. To this end, most developing countries simultaneously adopt very similar policies. They offer incentives, such as “financial and tax incentives” as well as “market preferences” to encourage FDI in any case. In other words, they focus on the “quantity” of FDI rather than its “quality”. However, in the literature, it has been

started to be focused on the “quality” of FDI rather than its “quantity” in order to be beneficial for economic development of the host country.

There is a list of indicators of the “quality” of FDI maintained in the literature. One of them is accepted as the “mode of entry” of the FDI, which can be greenfield versus brownfield investments. “Mode of entry” of the FDI is significant in order to have its direct positive impact on economic development through investment, namely, gross fixed capital formation. In this regard, it is maintained that compared to the other mode, greenfield investment is accepted more useful for the economic growth of the host developing country. London Economics (2010) maintain that when compared to brownfield investments, greenfield investments have a more certain and direct impact on GDP growth by increasing the capital formation of the economy since they occur as real investments in structures, factories etc. (London Economics, 2010: 23).

Following several works in the literature such as Singh (2005a, 2005b), Globerman and Shapiro (2004), UNCTAD (2000) and London Economics (2010), cross-border Mergers & Acquisitions (M&As) are used as a proxy for brownfield investment. It is argued that compared to greenfield investment its impact on economic growth through increasing capital stock is problematic. In other words, its impact can be less certain and accepted not as much as the impact of greenfield investment, at least in the short-run. UNCTAD (2000) argues that cross-border M&As do not have an immediate impact on increasing the additional capacity on productivity and employment of the host developing country. On the other hand, Greenfield FDI can do this besides sustaining the needed resources and assets. UNCTAD (2000) concludes that due to all this, their benefits to developing countries are much more than the benefits of cross-border M&As (UNCTAD, 2000: 198).

The aims of this paper are to empirically investigate the hypothesis that the direct effect of the greenfield investment on economic development is greater than the direct effect of the brownfield investment and empirically investigate the second hypothesis of the paper that brownfield investment needs additional requirements to have direct impact on economic development, which can be seen in the long run, not an immediate effect. In this regard, through a cross-section data analysis the ratio of value of cross-border M&As to FDI inflows, which is used as a proxy of brownfield investments, and the ratio of value of greenfield investments to FDI inflows are used as potential growth determinant/explanatory variables, among some other significant determinants, used in the applied works, within the context of several models.

It can be said that the potential contributions of the paper to the existing literature are the empirical analysis, itself, which is the cross-section data analysis with the calculated proxies of brownfield and greenfield investments, and also the findings of such empirical analysis which are consistent with the theory and going further than the existing literature. In this regard, the main findings support the argument that compared to the other mode, greenfield investment is more useful for the economic growth of the host developing country in order to have a direct positive impact on its economic development through investment. Moreover, as another original contribution, it is found that the brownfield investments need additional requirements to have a direct impact on economic development and such additional requirement should be the human capital development, rather than financial development, contrary to some existing studies such as Hermes and Lensink (2003).

After the introduction part, the paper tackles the topic by a brief literature review and then by an empirical analysis including the variables and empirical testing.

## 2. The Literature Review on FDI, “Spillover” Benefits, Quality versus Quantity of FDI

In theory it is generally agreed on that FDI has several important impacts on economy of the host country (Sarialioglu Hayali, 2009: 7). Milberg (1999) lists them as follows “1-promotes economic growth and development 2-raises employment and wages 3-generates technological spillovers that raise productivity 4-provides export market access 5-leads to improvement in the balance of payments” (Milberg, 1999: 100). Hermes and Lensink (2003) maintain that in addition to the direct increase of capital formation of the host country, FDI also can help increasing growth by introducing new technologies, managerial skills, ideas, and new varieties of capital goods. Saralioglu Hayali (2009) argues that all these can create spillovers<sup>1</sup>. Hermes and Lensink (2003) explain the ways of the spillovers in theory as follows: 1-By “demonstration and/or imitation”, which means new products or technologies of Multinational Companies (MNCs) are imitated by local firms. 2- By “competition”, which means local firms get under pressure to adapt new technologies after the entrance of MNCs to the markets. 3-By “linkages”, which means transactions between MNCs and local firms. 4-By “training”, which means local firms invest their human capital through developing the skills and knowledge of their employees to make them to adapt the new technologies that MNCs developed (Hermes and Lensink, 2003: 143). According to Chudnovsky and Lopez (1999) technology spillovers can be gained by developing countries from MNCs through four ways which can be listed as first by FDI of MNCs, second joint ventures of MNCs with the local firms including “strategic partnership”, third buying technology directly from the MNCs by contracts such as patents, licensing and fourth non-contractual ways such as reverse engineering, imitation of what MNCs did without willing of the MNCs (Chudnovsky and Lopez, 1999: 7).

Indeed, we can accept the first way (FDI) including the second one, as M&As, and reduce the number of ways from four to three. However, when it is looked at the findings of the empirical studies on FDI and its spillovers or growth, it does not seem as a rule that FDI will create these spillovers in every host country. In this regard, it is criticised as the benefits of FDI are difficult to measure and also are not uniform, which depend on both the conditions of the host developing countries, and the MNCs, themselves, and their investments’ characteristics (Sarialioglu Hayali, 2009: 8).

In other words, as Saralioglu Hayali (2009: 8) points out that in literature there is a consensus that benefiting of these spillovers depends on the “absorptive capacity” of the host country. Saralioglu Hayali (2009: 8) puts that absorptive capacity of the host country refers to its infrastructure, education system, human resource, institutions, a minimum level of scientific and technical knowledge, which is required to use innovation, dynamic business climate, well-functioning markets, establishment of property rights (especially intellectual property rights), past industrialisation experience *so forth* (Bhagwati, 1978; Findlay, 1978; Perez and Soete, 1988; Ozawa, 1992; Balasubramanyam *et al.*, 1996; Borensztein *et al.*, 1998;

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<sup>1</sup>The term “*spillover*”, used here, is defined as “the beneficial effects of inward FDI are contagious in host countries, both within and across countries” by Milberg (1999: 109).

Xu, 2000; Smarzynska, 2002; Narula and Marin, 2003; Adeniyi *et al.*, 2012). Lall and Narula (2004) refer to Narula (2004) which handles absorptive capacity in four categories: 1-Firm- sector absorptive capacity 2-Basic infrastructure 3-Advanced infrastructure 4-Formal and Informal institutions (Lall and Narula, 2004: 455). Thus; it is argued that because of these reasons stressed above there cannot be found any correlation between FDI and economic development in the least developed economies, namely poor countries such as sub-Saharan Africa, whereas in the middle income developing economies, especially in 10 economies such as China, Mexico, Singapore, Hong Kong, China, Brazil, Malaysia, Argentina, Indonesia, Chile and Poland, some spillovers have been identified (Sarıaloğlu Hayali, 2009: 8). On the other hand, Adeniyi *et al.* (2012), which examine the relationship of FDI with the growth in the presence of financial development regarded as absorptive capacity for the five countries of the Economic Community of West African States (ECOWAS), such as Cote d'Ivoire, Gambia, Ghana, Nigeria and Sierra Leone, maintain that there are differences among even African countries in attracting FDI and benefitting it in terms of development. In this regard, through their empirical analysis they found that depending on the financial indicator used as the proxy of financial development there is impact of FDI on development via such financial development channel for Ghana, Gambia and Sierra Leone. However, such relationship even under financial development does not exist for Nigeria although it attracts higher FDI (however, resource seeking one) compared to the others due to its oil resources (Adeniyi *et al.*, 2012: 110, 116-121).

In this regard, as Sarıaloğlu Hayali (2009: 8-9) puts within these empirical studies it is criticised as there is more evidence that direction of causality between FDI and Development is opposite, which means that economic growth affects, namely, attracts FDI. Sarıaloğlu Hayali (2009) maintains that this positive relationship between FDI and economic development has been identified statistically significant when higher-income group of developing countries are considered, but not the lower-income group of developing countries. It should not be surprising at all since higher-income developing countries have absorptive capacities that both lead the benefiting of spillovers and attracting “market-seeking FDI” (Sarıaloğlu Hayali, 2009: 8-9). As Sarıaloğlu Hayali (2009: 9) points out that it is also consistent with the theory that apart from the aid, FDI has a tendency of seeking higher-income growth and political stability. Thus; as Milberg (1999) argues that although FDI can be a more significant part of a development strategy for middle-income countries, it is not valid for the poor countries which do not have absorptive capacity for both attracting and benefiting FDI (Milberg, 1999: 110).

On the other hand, as Sarıaloğlu Hayali (2009) maintains that studies point out that for middle-income countries, it is not the only case that FDI has a positive impact on growth. In theory, it is criticised as the spillovers can be few or even negative if the MNCs force domestic firms out of the market because of the scale effect, namely, greater competition causing lower profits, which local firms cannot survive with (Sarıaloğlu Hayali, 2009: 9). Thus; FDI in a host country can “crowds out” the existing investment of the local firms instead of “crowds in” the further investment (Singh, 2005a: 11). There have been also large and controversial results on this issue which Sarıaloğlu Hayali (2009) gives the example of Agosin and Mayer (2000) that examine the effect of FDI on local investments in host country either positive as “crowding in” or negative as “crowding out”, by investigating the three developing regions, Asia, Latin America and Africa for the period of 1970-1996. They find that

the impact of FDI on development is not uniform, namely, as a strong “crowding in” in Asia, but “crowding out” in Latin America and neutral effects in Africa. Sarialioglu Hayali (2009: 9) maintains that these findings of Agosin and Mayer (2000) about Africa is consistent with the theory of absorptive capacity of the host country, but the other two seem to be inconsistent, while Latin America has absorptive capacity.

They maintain that the empirical results indicate that the assumption, which is widely accepted towards FDI by most of the developing countries that FDI is beneficial for development in any case and so to have such positive effects a liberal regime towards the MNEs is enough, is not valid anymore. Although the Latin American countries conducted the most comprehensive liberalisation programs on FDI in the 1990s, they did not benefit from the “crowding in” at all when compared with the Asian countries, which were known as the least liberal towards FDI in the developing world (Agosin and Mayer, 2000: 17).

So, as Sarialioglu Hayali (2009: 9) maintains that in the literature it is strongly argued that the host countries which have even absorptive capacities should implement “*national development and technological plans*” to benefit the FDI, as in Asia (Dunning, 1994; Freeman and Hagedoorn, 1989; Milberg, 1999). Moreover, it is argued that governments should play the role of “*a market facilitator and provider of complementary assets*” (Narula, 2003; Dunning, 1997; Stopford, 1997) and also, governments should play national policies to promote MNCs “*into improving and upgrading capabilities to sustain more technologically sophisticated industrial activities, [by not] ...only [on] attracting the investment but also [on] deepening its presence in the host economy on the basis of dynamic not static comparative advantages*” (Mortimore and Vergara, 2004: 525). In other words, as Sarialioglu Hayali (2009: 9) points out that they should regulate FDI to promote their economic development. Thus; they can prevent the market failures, which are defined by the following words that Singh (2005a) quoted from the UNCTAD Secretary General R. Ricupero:

*TNC investment process in its relationship to developing countries. The first (kind of market failures) arise from information or co-ordination failures in the investment process, which can lead a country to attract insufficient FDI, or the wrong quality of FDI. The second (kind of market failures) arises when private interests of investors diverge from the economic interest of home countries* (Singh, 2005a: 12).

As mentioned in Sarialioglu Hayali (2013) in the literature of FDI it has been started to be focused on the “quality” of FDI rather than its “quantity” in order to be beneficial for economic development of the host country (Sarialioglu Hayali, 2013: 3). Lall and Narula (2004) maintain that the quality of FDI depends on the “*scope and competence of the subsidiary*” of the MNCs. All these are partly connected with the “*factors internal to MNCs, including their internationalisation strategy, the role of particular affiliates in their global system and the motivation for their investment*” (Lall and Narula, 2004: 450). Much of these are outside the scope of the effect of the host countries. In this regard, Sarialioglu Hayali (2013) underlines that the motivation of the FDI is vital in determining the linkages and externalities. Narula and Dunning (2000) list four main motives for FDI as 1-seeking natural resources; 2- seeking new markets; 3- restructuring existing foreign production; and 4- seeking new strategic

assets. Lall and Narula (2004) classify them into two categories: *“The first category includes the first three motives: asset-exploiting, to generate economic rent by using existing firm-specific assets. The second category is the fourth motive: asset-augmenting, to acquire new assets that protect or enhance existing assets.”* They argue that developing countries mostly attract the wrong quality of FDI as the first category above, instead of attracting the second category of FDI. Lall and Narula (2004) maintain that since all subsidiaries do not offer the same spillovers to host countries, they cannot be in the same efficiency for development, by giving an example as follows: A sales office as an affiliate can have high turnover and employ many people, but its technological spillovers will be limited relative to manufacturing facility (Lall and Narula, 2004: 451). Also, Sarıaloğlu Hayali (2013) points out that if some performance requirements, such as hiring local people or something else by MNCs, were banned then even employing many people would not produce expected spillover benefits for the host country (Sarıaloğlu Hayali, 2013: 4).

Sarıaloğlu Hayali (2013) argues that the right quality FDI depends on some characteristics. Chudnovsky and Lopez (1999) list such characteristics as follows: 1-The kind of FDI according to its goal whether market-resource-efficiency seeking or asset-seeking; 2-The life-cycle stage of the relevant product/sector; 3-Whether the product of FDI can be exported and the importance of the affiliate in the global corporate network; 4-The entry mode of FDI whether Greenfield or Brownfield; 5-The home country of FDI and 6-The sector where the MNC operates (Chudnovsky and Lopez, 1999:10). They maintain that all kinds of the FDIs do not have the same or equal effects on the growth and sustainable development of the host country since such impacts depend on the type of FDI, the sector where it participates, structural characteristics and the development styles and the existing incentives, both price and non-price, in the host country (Chudnovsky and Lopez, 1999: 6).

Sarıaloğlu Hayali (2013) maintains that one of the indicators of the “quality” of FDI is accepted as the “mode of entry” of the FDI, which can be greenfield versus brownfield investments, into the host country (Sarıaloğlu Hayali, 2013: 5). In the same work it is stressed that greenfield investment is important to have a direct positive impact on economic development through investment, namely, gross fixed capital formation. In this regard, Sarıaloğlu Hayali (2013) refers to the work of Milberg (1999) which maintains that when the FDI is realised by the acquisition of the existing assets in the host country and/or merger with them it is called “brownfield investment”. It does not sustain the required addition at all to the capital stock, output or employment if they only lead to a change of the ownership of the existing asset without adding to the productive capacity or productivity, compared to the “greenfield investment” leading a net addition to the host country’s capital stock. Moreover, Milberg (1999) underlines that in the brownfield investment when entirely new productive capacity is not placed, the technology spillover also can be seen in question (Milberg, 1999: 107). London Economics (2010) argue that compared to greenfield investment its impact on economic growth through increasing capital stock is problematic, can be less certain and accepted not as much as the impact of greenfield investment, at least in the short-run (London Economics, 2010: 23). On the other hand, Lall (2000) argues that the benefits of the M&As depend on the characteristics of the host country and the conditions in which local firms are acquired. Under those circumstances, they could increase output by raising productivity through better technology and/or management (Lall, 2000: 14).

Sarialioglu Hayali (2013) maintains that although in the literature there have been large empirical works on FDI and economic development/ growth (See for instance Balasubramanyam *et al.*, 1996; Borensztein *et al.*, 1998; Agosin and Mayer, 2000; Carcovic and Levine, 2002; Hermes and Lensink, 2003; Samimi *et al.*, 2010 and Adeniyi *et al.*, 2012 *etc.*) there are few studies working directly on the relationship of the two different components of FDI with economic development/growth (Sarialioglu Hayali, 2013: 6-7). This is mostly due to the lack of the relevant data or the limitations of the existing data in terms of working empirically. Among these few studies in the literature, Saralioglu Hayali (2013:7-8) tackles the work of Calderón *et al.* (2002) which investigate the relationship of the two different components of FDI with investments and economic growth and the relationship of these components of FDI with each other. It is reviewed that in the work of Calderón *et al.* (2002) a large cross-country time-series data set including the data of both 21 developed and 61 developing countries is used for the period of 1987-1999 in a bivariate vector autoregressions (VAR) analysis. According to the work of Calderón *et al.* (2002) in the developed countries there is a bi-directional relationship between M&As and greenfield investments, namely, higher M&As lead more greenfield investments *and vice versa*. However, it is stressed that for the developing countries the relationship is uni-directional, namely, just from the M&As to greenfield investments. Moreover, it is added that while for developing countries domestic investment is followed by both types of FDI, the reverse is not the case. On the other hand, it is stressed that for developed countries domestic investment is just followed by M&As and the reverse is the case for just greenfield investments. Lastly, it is pointed out that regarding the relationship between economic growth and FDI they find that increases in the growth rate lead both types of FDI in developed countries and just greenfield investments in developing countries. More importantly, it is underlined that Calderón *et al.* (2002) reach a result that neither types of FDI have a significant impact on economic growth in both developed and developing countries concluding that “the relationship between FDI and growth depend largely on third factors driving both variables” (Calderón *et al.*, 2002: 8-16). Saralioglu Hayali (2013:8) tackles the work of London Economics (2010), as another significant study, which aims to measure the relative performance of the two types of FDI and the contribution of FDI to economic growth for the European Union (EU) 27 countries for the period of 2007-2009. It is reviewed in the work of Saralioglu Hayali (2013:8) that London Economics (2010) first construct their own data of the M&As by using Zephyr database and deduct the estimate of this data from the official FDI inflows to obtain a rough data of greenfield investments. As a next step, they compare the greenfield investments with the investments financed by the domestic residents as percentages of the private gross fixed capital formation. It is underlined that according to the findings of London Economics (2010) very small proportion of the total private gross fixed capital formation in the EU 27 is greenfield inward FDI. It is told that as a last step, they evaluate the effects of the greenfield investments on real GDP growth by comparing the actual level of GDP with the level of GDP that would be obtained if the greenfield investments did not involve for the period of interest. It is stressed that according to the findings of London Economics (2010) in the wake on the financial crisis in 2008 real growth in GDP in the EU27 was lower due to a collapse in inward greenfield FDI and the more significant result that they obtained is put as follows “More importantly, the recession would have been almost half of a percentage point deeper in the absence of greenfield inward FDI” (London Economics, 2010: 23-28).

### 3. The Empirical Analysis

In order to test the null hypothesis a cross-section data covering 57 developing countries<sup>2</sup> for the era of 1990-2010 is used through a cross-section data analysis using Ordinary Least Squares (OLS) method to investigate the potential effects of the greenfield and brownfield (M&As) investments of the FDI on the growth of the developing countries. Data, which is mostly taken as an average of the years for the period 1990-2010 for a sample of 57 countries, is available for almost all of the variables for the countries used in this work.

#### 3.1. The Variables

Table 1 indicates the symbols, definitions, units and scales of dependent and independent variables used in the analysis.

**Table 1. Explanations of Dependent and Independent Variables**

Symbols	Definitions	Units and Scale	Sources
lgr	Natural log of the per capita growth rate	Rate	The World Bank World Development Indicators& Global Development Finance (2011)
lingdp	Natural log of the initial gdp	US Dollars Millions	The World Bank World Development Indicators& Global Development Finance (2011)
lhd	Natural log of the human capital development	Rate	The World Bank World Development Indicators& Global Development Finance (2011)
lfindev	Natural log of the financial development (Credits to the private sector as a percentage of GDP)	Percentage	The World Bank World Development Indicators& Global Development Finance (2011)
ltrade	Natural log of the openness	Rate	The World Bank World Development Indicators& Global Development Finance (2011)
lmarate	Natural log of the ratio of M&As to FDI	Rate	UNCTAD Cross-border M&A database ( <a href="http://www.unctad.org/fdistatistics">www.unctad.org/fdistatistics</a> )
lgrerate	Natural log of the ratio of Greenfields to FDI	Rate	UNCTAD Cross-border M&A database ( <a href="http://www.unctad.org/fdistatistics">www.unctad.org/fdistatistics</a> )
dafr	dummy for African countries	Dafr=1 or Dafr=0	-
dasO	dummy for Asian (and other) countries	DasO=1 or DasO=0	-
dlat	dummy for Latin American countries	Dlat=1 or Dlat=0	-

The following part summarises the dependent and independent variables, including their possible relationships with growth, their hypotheses with the expected signs of their coefficients.

#### The Dependent Variable

**Lgr (natural log of the per capita growth rate):** It is average real per capita growth rate over 1990-2010 period of which expected coefficient sign is positive,

<sup>2</sup>Albania, Algeria, Angola, Argentina, Azerbaijan, Bangladesh, Belarus, Bolivia, Brazil, Burkina Faso, Cape Verde, Chad, Chile, China, Colombia, Costa Rica, Croatia, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Ghana, Honduras, Hong Kong-China, India, Indonesia, Iran, Jamaica, Kazakhstan, Kenya, Korea Rep., Malaysia, Mauritania, Mexico, Morocco, Nepal, Nicaragua, Nigeria, Pakistan, Paraguay, Peru, Philippines, Russian Federation, Rwanda, Sierra Leone, Singapore, South Africa, Sri Lanka, Sudan, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uruguay, Venezuela-RB, Zambia.



pointing out that if it increases then the development, which is here proxied and measured by growth in GDP per capita, increases.

#### **Independent/Explanatory Variables**

The ones, which were “*generally accepted to be important to the economic growth*” in growth literature and agreed on that they had “*a robust effect on economic growth*” (Hermes and Lensink, 2003: 148), are as follows:

**Lingdp (natural log of the initial gdp):** It is GDP per capita in 1990 as a measure of “the process of catch up”. Constituting the “initial income” it is also defined as one of the “*standard new growth theory variables*” or “*orthodox new growth theory variables*” (Mosley, 2004: 762-763).

**Lhd (natural log of the human capital development):** It is the secondary school enrolment rate in 1990 (or in the year in which the data available first) as a measure of human capital development. Constituting the “education” it is also defined as the second of the “*standard new growth theory variables*” or “*orthodox new growth theory variables*” (Mosley, 2004: 762-763)<sup>3</sup>.

Other variables are as follows:

**Lmarate (natural log of the ratio of M&As to FDI):** Following several works in the literature such as UNCTAD (2000), Calderón *et al.* (2002), Globerman and Shapiro (2004), Singh (2005a, 2005b), London Economics (2010) cross-border M&As is used as a proxy of brownfield investment. Compared to greenfield investment the impact of brownfield investment on economic growth through increasing capital stock is seen problematic. In other words, its impact on economic growth can be less certain and accepted not as much as the impact of greenfield investment, at least in the short-run. UNCTAD (2000) puts it as follows:

*Under normal circumstances (i.e. in the absence of crises or systemic changes), and especially when cross-border M&As and greenfield investments are real alternatives, greenfield FDI is more useful to developing countries than cross-border M&As. Other things (motivations ,capabilities) being equal, Greenfield investment not only brings a package of resources and assets but simultaneously creates additional productive capacity and employment; cross-border M&As may bring the same package but do not create immediate additional capacity* (UNCTAD, 2000: 198).

The data is taken from the UNCTAD Cross-border M&A database, which is accepted as a useful available data “*on cross-border M&A activity*” allowing to compare “*between these data and over-all foreign direct investment flows*” (Globerman and Shapiro, 2004: 9). Following Globerman and Shapiro (2004), it is calculated as a ratio of the data of the value of cross-border M&As by region/economy of seller to the data of FDI inflows by region and economy, which is also taken from the UNCTAD (web table 1). As also underlined in the Globerman and Shapiro (2004), although both data seem to come from a single source, UNCTAD, in reality, UNCTAD gathered them from different sources, such as M&As data from Thomson Financial and FDI inflows data from IMF data

<sup>3</sup>The last factor of the “standard new growth theory variables” is physical investment. Since the impacts of the greenfield and brownfield investments to FDI ratio on growth is wanted to be investigated “through investment” here rather than “through efficiency”, the investment variable was not included.

(Globerman and Shapiro, 2004: 10). Therefore, the data can be problematic to compare<sup>4</sup>, especially in the year base. So, in this study, it is also taken as an average of the years for the period 1990-2010 for a sample of 57 countries in order to overcome the problems stemming from the calculation differences so forth. Globerman and Shapiro (2004) put it as follows: *“In order to minimize problems created by negative inflows, non-coincident payments, and single large transactions, and to facilitate comparisons among the variables, we chose to average the various series over the sample period”* (Globerman and Shapiro, 2004:10).<sup>5</sup>

**Lgrerate (natural log of the ratio of Greenfields to FDI):** It is accepted as one out of the two modes of entry of FDI into a country and compared to the other mode (M&As), it is accepted more useful to economic growth. Following the works in the literature such as London Economics (2010) and Calderón *et al.* (2002), it is calculated by subtracting the data of cross-border M&As from the data of FDI inflows, which are both taken from the UNCTAD database. Since FDI includes both *“M&A related flows and greenfield or other physical investment related flows”*, following London Economics (2010) for simplicity *“all the greenfield and other physical investment related inflows”* will be accepted as *“greenfield FDI”* (London Economics, 2010: 23).

The ones, which are defined as control variables in this study, are as follows:

**Lfindv (natural log of the financial development):** It is the log of credit to the private sector as a percentage of GDP, which is a proxy for financial development. Although other variables can be used for measurement of financial development, following the Hermes and Lensink (2003) this variable was used due to data limitations of the other variables. The expected sign of this variable is positive pointing out the positive relationship with the economic growth.<sup>6</sup>

**Ltrade (natural log of the openness):** It is the log of the total trade (exports plus imports) to GDP, which is a proxy for “degree of openness”. Although it is indeed a measure of “trade openness”, it is widely used as a proxy for all openness of the

<sup>4</sup>Globerman and Shapiro (2004) put it as follows: *“FDI flows include investment funds transferred between a parent and an affiliate. Negative flows can therefore be recorded if funds are withdrawn from an affiliate. The M&A series record the value of the transaction at the time it is finalized, and therefore cannot be negative. It is therefore possible that the value of recorded cross-border activity exceeds the value of recorded FDI (FDO) activity, despite the fact that the latter is the more comprehensive measure. In addition, the two series may not involve coincident temporal flows of funds if an M&A transaction involves staged payments, or if the date recorded by Thomson as the final date does not coincide with the recording of funds transferred in the balance of payments. Thus, use of a single year’s data can be misleading, particularly for small countries, where a single remittance by an affiliate in a given year can create temporary and possible large changes (negative) in recorded FDI. Likewise, a single large M&A can create large recorded inflows/outflows even for relatively large countries”* (Globerman and Shapiro, 2004: 10).

<sup>5</sup>Moreover, normally at the final stage the ratios also should be checked and adjusted in order to create meaningful ratios by overcoming the problems stemming from the time inconsistencies of the data calculations. According to this, if recorded value of M&A amounts for a country exceeds its total FDI inflows, a value of one is assigned (Globerman and Shapiro, 2004: 12). It is maintained that *“This procedure was necessary because for some countries, very small reported FDI flows were accompanied by large reported M&A amounts, resulting in implausibly large ratios”* (Globerman and Shapiro, 2004: 12). However, in our database we did not have such a problem, so we did not need to do this adjustment.

<sup>6</sup>It should be noted that there can also be “reverse causality” between economic growth and financial development proxied as credits to the private sector, pointing to the causality running from growth to the credits. However, here, it can be said that thanks to the cross-sectional data analysis this possible reverse causality issue is ignored or solved naturally.

economy. The expected sign of this variable is positive pointing out the positive relationship with the economic growth.

**Regional Dummies (dafr, dasO, dlat):** They are regional dummies for Africa (dafr), Asia (and other) (dasO), and Latin America (dlat) in order to investigate whether or not the results are different for specific country regions to capture the impact of region on growth. It is calculated as a dummy variable taking a value of 1 if the country is in the African region (Dafr=1) and if not a value of 0 (Dafr=0); a value of 1 if the country is in the Asian (and other) region (DasO=1) and if not a value of 0 (DasO=0) and a value of 1 if the country is in the Latin American region (Dlat=1) and if not a value of 0 (Dlat=0).<sup>7</sup>

### 3.2. Empirical Testing

#### 3.2.1. The Model

The model specification is as follows:

$$Lgr = a_i + B_{i,j}S + B_{m,j}F + B_{z,j}C + e \quad (1)$$

where  $S$ ,  $F$  and  $C$  are vectors of variables and  $e$  is error term.  $S$  is a proxy for the vector of variables which are “standard new growth theory variables” generally accepted as to be important for the economic growth.  $F$  is a proxy for the vector of variables which are focused or interested in this study.  $C$  is a proxy for the vector of a limited number of variables chosen from the ones used in Hermes and Lensink (2003), as well as Adeniyi *et al.* (2012) using financial development and Samimi *et al.* (2010) using trade openness, which are used as control variables in this work. According to this model specification, the first model shown in the column [1] of the Table 2 below indicates the base specification of the model including standard/core variables and the other variables of the paper<sup>8</sup>. The other columns of the results table indicate the base specification of the model with additional variables used as control variables in this research.

#### 3.2.2. The Interpretation and Evaluation of the Results

According to the first column of the Table 2, both brownfield investment proxied by M&As and greenfield investment have significant positive direct effects on economic growth. Since the aim of the paper is to empirically investigate the hypothesis that the direct effect of the greenfield investment on economic development is greater than the direct effect of the brownfield investment, the results support the main hypothesis. According to this it can be said that the ratio of the greenfield investment to FDI has greater impact on economic development than the ratio of the brownfield investment. However, as seen in the column [2], when the control variables such as financial development and openness are added to the base model, the variable of brownfield investment does not have a significantly positive direct effect on economic growth. On the other hand, in this case greenfield investment does still have a significantly positive effect and its effect is even more when compared with the first results. Moreover, financial

<sup>7</sup> In order to avoid “dummy variable trap”, African region dummy is dropped in the regression to prevent the perfect collinearity with the constant.

<sup>8</sup> This modelling approach is also consistent with the one used by Greenaway *et al.* (2002), which follows the works of Barro (1991), Easterley and Levine (1997) and Sachs (1997) by a dynamic rather than static estimating model (Greenaway *et al.*, 2002: 235).

development has a statistically significant effect on economic growth. When we investigate more in order to find out whether additional requirement is needed to have a positive impact of brownfield investment on economic development, we have the results indicated in the third column. Obtaining such results supports the second hypothesis of the paper that brownfield investment needs additional requirements to have a direct impact on economic development. According to this, the interactive terms,  $lmarate * lhd$  and  $lmarate * lfindv$ , were added to the model as seen in the column [3]. The interactive term  $lmarate * lhd$  was found statistically significant and positive, but not the other. Also, in this case, financial development was not found statistically significant. According to these interactive terms' results, brownfield investment has a positive effect on economic growth if the human capital development has reached a certain minimum level, supporting the view that it needs additional requirements to have a direct impact on economic development. Moreover, it supports the view that the direct effect of brownfield investment on economic growth cannot be seen in the short-run, it can be seen in the long run, which is consistent with the variable of human capital development which has a long-run relationship with economic development.

Following the method of Hermes and Lensink (2003), the threshold value of human capital development can be obtained in order to find out the value which brownfield investment starts to have a positive effect on economic development (Hermes and Lensink, 2003: 152). In order to be able to do this, the model presented in the column [3] is differentiated with respect to brownfield investment. It is as follows:

$$\Delta(lgr) / \Delta(lmarate) = -0.584 + 0.264 * lhd \quad (2)$$

The threshold level of  $lhd$  above which brownfield investment ( $lmarate$ ) has a positive effect on economic growth can be calculated by setting the first derivative of the above equation equal to zero. According to this, the threshold level equals to 2.21 ( $0.584/0.264$ ). Since  $lhd$  is the natural logarithm of the secondary school enrolment rate in 1990 (or the year in which the data available first), the result can be interpreted that brownfield investment ( $lmarate$ ) will have a positive effect on growth in countries where secondary school enrolment rate is above 9.1. According to this threshold, just 3 out of 57 developing countries do not satisfy this threshold.

The fourth column of the paper indicates the further analysis in order to find out whether the results of the column [3] are different for specific geographic regions, which are proxied by dummies, such as dummy for African country ( $dafr$ ) and dummy for Asian (and other) countries ( $dasO$ ), here. According to the results of the column [4], the main results of the column [3] do not change, but two different things are added. First, openness proxied by  $ltrade$  is found statistically significant; however, its expected sign is inverse. This may be resulted from the multicollinearity between  $ltrade$  and  $lfindv$  (See appendix). Second, regional dummy for Asian (and other) countries has a statistically significant coefficient. This means that the results are different for the Asian countries.

**Table 2. The Results Table of the Regression Analyses**

Independent Variables \ Models	[1]	[2]	[3]	[4]
<b>C(constant)</b>	<b>0.842</b>	<b>1.197</b>	<b>-0.417</b>	<b>-0.105</b>
SE	(0.721)	(0.887)	(1.109)	(1.071)
P value	[0.25]	[0.18]	[0.71]	[0.922]
<b>lingdp</b>	<b>0.089</b>	<b>0.038</b>	<b>0.032</b>	<b>0.066</b>
SE	(0.098)	(0.111)	(0.107)	(0.107)
P value	[0.37]	[0.73]	[0.76]	[0.54]
<b>lhd</b>	<b>-0.022</b>	<b>-0.105</b>	<b>0.451</b>	<b>0.397</b>
SE	(0.144)	(0.146)	(0.318)	(0.335)
P value	[0.88]	[0.48]	[0.16]	[0.24]
<b>lmarate</b>	<b>0.183</b>	<b>0.142</b>	<b>-0.584</b>	<b>-0.627</b>
SE	(0.092)	(0.090)	(0.319)	(0.305)
P value	[0.05]**	[0.12]	[0.07]***	[0.05]**
<b>lgrerate</b>	<b>1.107</b>	<b>1.272</b>	<b>1.643</b>	<b>1.564</b>
SE	(0.444)	(0.437)	(0.466)	(0.462)
P value	[0.02]**	[0.01]*	[0.00]*	[0.00]*
<b>lfindev</b>		<b>0.332</b>	<b>0.315</b>	<b>0.272</b>
SE		(0.134)	(0.324)	(0.319)
P value		[0.02]*	[0.34]	[0.40]
<b>ltrade</b>		<b>-0.196</b>	<b>-0.217</b>	<b>-0.322</b>
SE		(0.197)	(0.190)	(0.191)
P value		[0.32]	[0.26]	[0.099]***
<b>lmarate* lhd</b>			<b>0.264</b>	<b>0.261</b>
SE			(0.152)	(0.154)
P value			[0.09]***	[0.097]***
<b>lmarate* lfindev</b>			<b>-0.045</b>	<b>-0.037</b>
SE			(0.152)	(0.157)
P value			[0.77]	[0.81]
<b>dafr</b>				<b>-0.105</b>
SE				(1.071)
P value				[0.922]
<b>dasO</b>				<b>0.428</b>
SE				(0.243)
P value				[0.09]***
<b>dlat</b>				<b>-0.043</b>
SE				(0.270)
P value				[0.87]
<b>R<sup>2</sup></b>	0.05	0.12	0.19	0.26
<b>F</b>	1.74	2.27**	2.59**	2.93*
<b>N</b>	57	57	57	57

\*significant at 1% level, \*\*significant at 5% level, \*\*\* significant at 10% level

R<sup>2</sup> is the adjusted R<sup>2</sup>. F is the F-statistic and if it is significant at the relevant level, it means that the overall model is statistically significant. N is the number of observations.

#### 4. Conclusion

Since the paper mainly argues that compared to the other mode, greenfield investment is more useful for the economic growth of the host developing country, the main findings of the paper support this argument. Moreover, it can be said that while greenfield investments do not need anything else to increase economic growth through investments brownfield investments need additional requirements to have a direct impact on economic development.

Second finding also can shed lights on why FDI alone cannot be found significantly effective on economic growth through investment in the applied literature, such as Hermes and Lensink (2003) who state that “*without additional requirements FDI does not enhance economic growth of a country*”. In this regard, we found that it is

true for only brownfield investments of FDI, but not for all kinds of FDI. Second, contrary to Hermes and Lensink (2003), we found that the additional requirement should be human capital development rather than financial development. The interaction of human capital development with brownfield investment was found statistically significant; however we could not find the same for the interaction with financial development. This finding together with the finding of statistically significance of the regional dummy for Asia are also consistent with the findings of Agosin and Mayer (2000), which maintain that although the Latin American countries implemented the most comprehensive liberalisation programs on FDI in the 1990s, they did not benefit from the “crowding in” at all when compared with the Asian countries, which were known as “the least liberal on FDI in the developing world” (Agosin And Mayer, 2000: 17).

All these findings are also consistent with the view in the literature, such as UNCTAD (2000) and London Economics (2010), who state that direct effect of brownfield investment on economic growth is not an “immediate effect”, it can only be seen in the long run. Because it is found that brownfield investment has a positive direct effect on economic growth if the human capital development has reached a certain minimum level and human capital development is accepted as a determinant of growth of which effects on economic development can be seen in the long-run. This is also consistent with the Lall (2000) which argues that benefits of the M&As depend on the characteristics of the host country, they could increase output by raising productivity through better technology and/or management (Lall, 2000: 14), which all consistent with the development of the human capital of the host country since as Carkovic and Levine (2005) put “*sufficiently high levels of human capital can exploit the technological spillovers associated with FDI*” (Carkovic and Levine, 2005: 206).

It can be concluded by answering the question in the title of the paper that FDI is not beneficial for development in any case and/or in equal amounts, at least, in having a direct positive impact on economic growth through investment. It needs additional special conditions. It needs to be more greenfield investment. However, from a broader perspective it can be said that it is not also enough to attract greenfield investment more. It is a first step to have “the right kind of FDI” for developmental purposes since the “quality of FDI” depends on more qualifications. In this regard, the mode of entry of FDI into a developing host country is a necessary but not a sufficient condition.

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## Appendices

### Appendix 1. Summary Statistics, 1990-2010

	Observation number	Mean	Standard Deviation	Minimum value	Maximum Value
lgr	57	0.74	0.69	-1.37	2.22
lingdp	57	7.01	1.03	5.10	9.51
lhd	57	3.73	0.72	1.77	4.60
lmarate	57	-2.10	1.28	-8.04	-0.26
lgreerate	57	-0.24	0.26	-1.47	-0.00
lfindv	57	3.28	0.82	1.42	5.02
ltrade	57	4.20	0.54	3.07	5.90

### Appendix 2. Correlation Matrix, 1990-2010

	lgr	lingdp	lhd	lmarate	lgreerate	lfindv	ltrade
lgr	1						
lingdp	0.09	1					
lhd	0.06	0.46*	1				
lmarate	0.08	0.12	0.27*	1			
lgreerate	0.19	-0.19	-0.18	-0.63*	1		
lfindv	0.27*	0.50*	0.37*	0.30*	-0.29*	1	
ltrade	0.03	0.39*	-0.05	-0.21	0.18	0.32*	1

Notes: \* significant at 5% level